

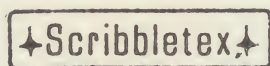


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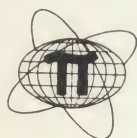
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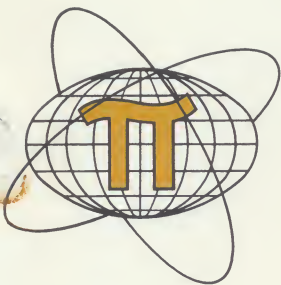


Productivity International, Inc.
A Network of Professionals

Sonia F. Mansfield
Vice President
Public Relations

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Dear Member of the Press:

Your interest in Productivity International, Inc., is greatly appreciated.

I have enclosed our current press materials and a brochure describing the services of Productivity International, Inc.

If you have any questions, need further information, or desire future press releases, please call our Dallas office, (214) 739-3056.

Sincerely,

Sonia F. Mansfield
V.P. Public Relations



Productivity International, Inc.

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NEWS RELEASE

FOR IMMEDIATE RELEASE:

NEW PUBLICATION-MANAGEMENTS' GUIDE TO COMPUTER INTEGRATED MANUFACTURING

The professional staff of Productivity International, Inc., have written a new publication for management. Managements' Guide to Computer Integrated Manufacturing, is designed to enable management to better understand and plan their efforts that will use high technology to promote increased productivity.

This guide concentrates on the management of technological productivity improvement. The key is the new uses of the computer. Today, management is being required to prepare for the management of computer integrated manufacturing.

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.

Publication

Managements' Guide to Computer Integrated Manufacturing

Page Two.

Managements' Guide to Computer Integrated Manufacturing, not only clarifies what topics are actually elements of CAD/CAM — it also relates how to plan the integration of all types of "smart" equipment — engineering design stations, machine tools, word processors, inspection devices, planning systems and much more. Management must retain a competitive edge by the integration of some of their existing systems with some new systems. This guide has been written to ease the fast orientation that will be required by management.

This guide explores the details of creating and managing the required Task Force team, the financial analyses including the justification of capital expenditures, and the planning and implementation — which includes a detailed list of considerations.

This publication is available from Leading Edge Publishing, Inc., 5622 Dyer St., Suite 217; Dallas, TX 75205; (214) 739-0340.

Price Per Copy	\$118.00
Postage & Handling	6.00
Total Cost	\$124.00

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.



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NEWS RELEASE

Subject: New Publication on Industrial Robots

A Survey of Industrial Robots

Edited by Dr. John J. Allan III

This new report is designed to give readers a fast start on the who, what, where, when, why and how of industrial robots.

This new report includes guidelines for integrating a robot into current manufacturing operations. The topics covered range from the technical aspects of an hierarchical computer based manufacturing system, to insuring the robot's social acceptability with employees. Also, applications, cost/benefit analysis, and a preview of coming capabilities resulting from advances in Artificial Intelligence, computer networking and other technologies are featured.

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.

This survey answers over 150 key questions in a tabular comparison for more than 20 vendors. For each vendor, the information required for purchase, installation, integration, and execution are given. Highlighted are comparisons of robot capabilities encompassing movement and accuracy, programming, control systems, etc.

This publication is available from Productivity International Inc.; Publications Department; P.O. Box 8100; 5622 Dyer Street Suite 225; Dallas, Texas 75205. The single copy price of \$146.00 includes postage and handling.

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.



Productivity International, Inc.

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NEWS RELEASE

Subject: New Book Available for Computer Aided Design
and Computer Aided Manufacturing (CAD/CAM)

CAD/CAM GLOSSARY, 3rd EDITION

Edited by Dr. John J. Allan III

Since the first (1965) edition of this glossary appeared, the distinction between Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) has blurred until the two are merely different aspects of one process.

This glossary, then, covers the basic computer terminology needed by any person entering CAD/CAM plus the language and acronyms of the latter. Entries run from ABEND (aborted end) to Zero Suppression and include a large number of 3-letter acronyms such as HIC (Hybrid Integrated Circuit) which are particularly valuable for interpreting training manuals (which tend to be overloaded with such acronyms and abbreviations).

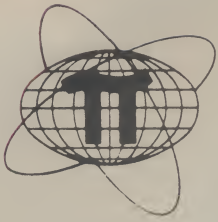
FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department;
Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225;
Dallas, Texas 75205; (214) 739-3056.

On the computer side, we may equally ask how many computer scientists remember that BASIC stands for Beginners All-purpose Symbolic Instructional Code.

Useful both for the aspirant from the production or design line faced with CAD/CAM and invaluable for the computer expert faced with work in this field.

This publication is available from Productivity International, Inc.; Publications Department; P. O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205. The 'single copy price of \$19.25 includes postage and handling.

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.



Productivity International, Inc.

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FOR IMMEDIATE RELEASE:

NEWS RELEASE

Dallas and the Robot Revolution

The robot, to most of us, is the science-fiction mechanical man that we associate with life in the future. However, it is becoming more and more clear that this future is within manufacturing industry today.

The comparatively new business of robotics involves applying the robot to a specific task and environment. The level of sophistication of the tasks performed by the robot is governed by the rate of technological progress afforded by today's engineering techniques.

The industrial robot today is defined in A Survey of Industrial Robots, researched and written by Productivity International, Inc. of Dallas, as "basically a single arm type of device that can manipulate parts or tools through previously taught sequences of motions and operations, but these sequences and operations need not necessarily be repetitive."

(continued)

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.

Dallas and the Robot Revolution

Page Two.

Dr. Warren F. Hastings of Productivity International, Inc. heads a team of consultants who assist manufacturing industries in the planning and implementation of the robots to be installed within their facilities.

A case in point occurred just recently. A manufacturing facility that uses an injection molding process contacted this Dallas based consulting company in order to develop a robotic facility that would free employees from the fumes and the intense heat. The robots would be able to sustain the heat produced by this manufacturing process and also maintain a 24 hour shift thereby preventing the dies from cooling, saving the manufacturer expensive down-time on his equipment and shortened lives for expensive dies.

The Dallas firm, Williamson & York, specializes in market research for the computer integrated manufacturing industry. They have projected the demand for products and services from the nation-wide robotics business to break the 600 million dollar mark by the close of 1982.

(continued)

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.

Dallas and the Robot Revolution

Page Three.

Michael Chambers, manager of operations at Leading Edge Publishing, Inc. quoted the cost of a robot, for industrial applications such as welding, spray painting material transfer etc., as ranging from \$5,000 for simple devices to about \$200,000 for a very sophisticated one. Typical costs would range from \$35,000 to \$100,000.

The pros and cons of installing a robot within a facility are explored in the publication A Survey of Industrial Robots, which is available from Leading Edge Publishing, Inc.; 5622 Dyer Street, Suite 217; Dallas, Texas 75206.

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.



Productivity International, Inc.

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NEWS RELEASE

Subject: New Book Available for Computer Aided Design
And Computer Aided Manufacturing (CAD/CAM)

A Survey of Commercial Turnkey

CAD/CAM Systems, Edition II - 1980

Edited by Dr. John J. Allan III

Productivity International is pleased to announce its newest publication, A Survey of Commercial Turnkey CAD/CAM Systems, Edition II - 1980, edited by Dr. John J. Allan III.

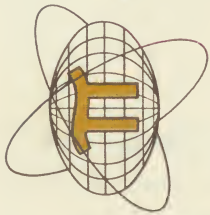
This newest survey is addressed to the thousands of potential industrial purchasers of CAD/CAM systems --- written to save them countless weeks of searching for information.

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department;
Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225;
Dallas, Texas 75205; (214) 739-3056.

This new edition features a tabular comparison of turnkey vendors, and also, of vendors offering hardware and software. Also, included are strategies for cost/benefit tradeoffs, management considerations, and guides for developing your system.

This publication is available from Productivity International, Inc.; Publications Department; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205. The single copy price of \$95.90 includes postage and handling.

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.



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COMPUTER INTEGRATED MANUFACTURING

IS
THE

FUTURE[©]

**are you
ready?**

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ABOUT

PRODUCTIVITY INTERNATIONAL, INC.

Productivity International, Inc. (PI) is an organization of experienced CAD/CAM consultants that has served industry in a wide variety of activities related to computer applications in design and manufacturing. Clients range in size from small privately held companies to large multi-national corporations. The products of these clients vary from simple bent wire brackets for the retail trade, to complex high technology aerospace and defense systems. Certain of our clients, whose names are available upon request, are willing to provide references and discuss the services provided to them by PI.

Some of the activities that the experienced consultants of PI have undertaken for clients include:

- The analysis of a company's engineering and manufacturing requirements for CAD/CAM systems, including cost/benefit analyses, system specification, benchmarking, installation and integration.
- The application of robotics and other techniques to automated assembly operations.
- Specifying flexible manufacturing systems including the integration of parts handling devices with machine tools and processes.
- Design of production automation systems using real time, on-line control and inspection.
- Investigation of systems for using telecommunications and networking to transfer manufacturing information between remote sites.
- Designing and specifying real time micro-processor systems for image processing and analysis.
- Developing factory simulation systems including manufacturing, distribution, and warehousing.
- Problem solving in automated manufacturing and warehousing systems.

- The design and specification of CAD/CAM systems for the production of the XM-1 tank and the cruise missile engine.
- Contributing to the design of the database system used in the Boeing 757/767 manufacturing program.
- The training of the in-house consultants of a large multi-divisional corporation whose products range from defense and aerospace systems to consumer durables. This training covered the techniques required to analyze the tasks and information flow within engineering and manufacturing operations, and to assess the need for new or extended computer based methods and other techniques to improve productivity.
- Being retained as technical advisors in the field of automation components to a major investment banker.
- Providing corporate education programs in CAD/CAM and automation for both management and employees.

The above list is not exhaustive but serves to give you an appreciation of the extensive experience we are able to bring to bear on any task which PI undertakes for a client. Our mature professionals each have at least 17 years of experience in one or more of these fields.

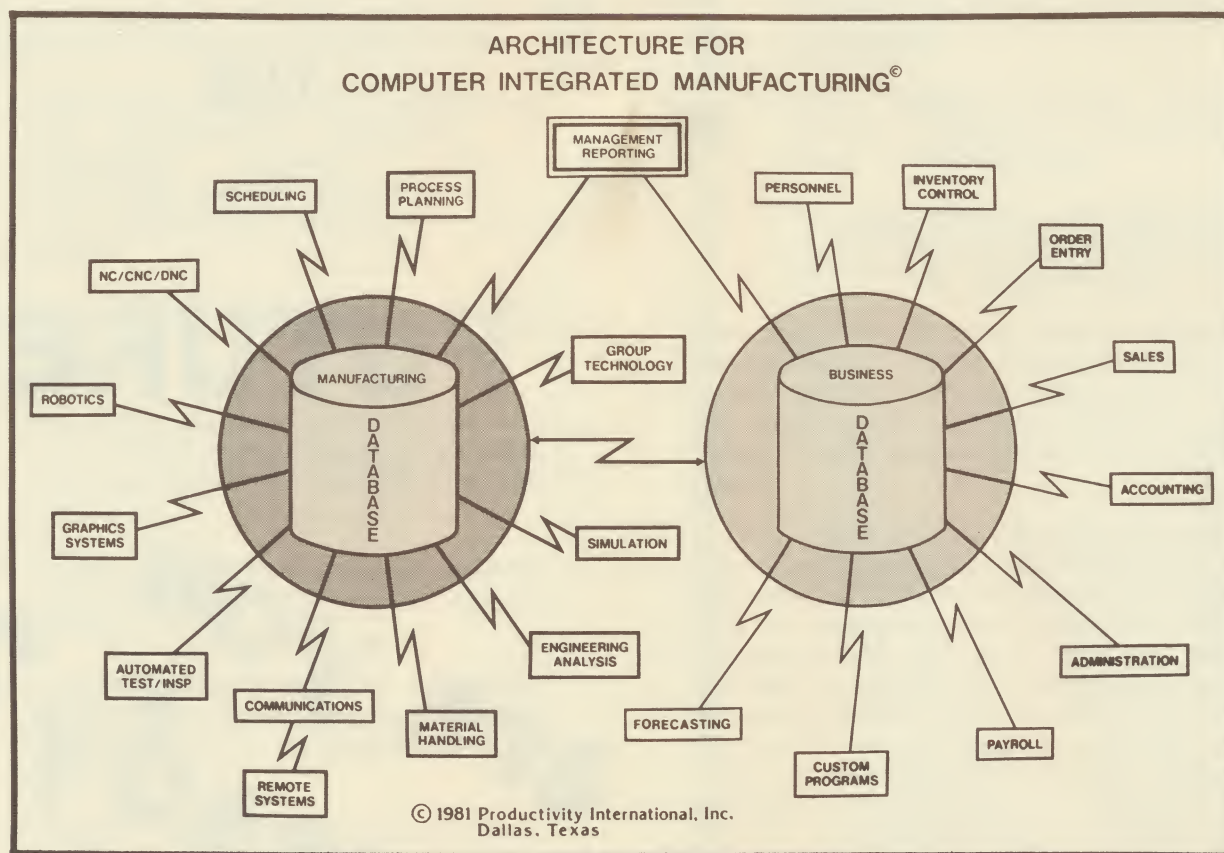
It is our belief that any task we undertake for a client should be a technology and information transfer experience for the staff members of the client. To this end, we usually work with a small team of experienced individuals from the client's company, who constitute the task force responsible for in-house data gathering, planning sessions, implementation, etc. To insure that the best available people are selected for the task force, PI will outline the required background and characteristics of the task force members and request that the client select suitable individuals from its staff. It is desirable that these individuals be released from other functions so that they may concentrate on the task force activities.

Productivity International's consultants have the experience necessary to help you apply the above technologies to improve productivity in your company. Resumes of our consultants are available upon request.

Today, many companies are investing in CAD/CAM systems to help improve productivity. These investment decisions are among the most important that can be made by management. However, it is essential that management realize that a decision to implement such a system is not just an issue of technology but one of strategic planning also. Implementation of a CAD/CAM system can result in significant market advantages with better quality products, lower costs, shorter design cycle times, faster response to customer requests and a more aggressive response to competition. Just as the potential gains are enormous, the costs can be significant too. If all the aspects relating to selection, cost/benefit analysis and the interfacing between design, manufacturing and management are not adequately considered, then in addition to the di-

rect costs incurred, a liability in the form of a useless database can evolve.

With correct design and planning your database can be one of the most important profit generating assets of your company. When properly designed and implemented in a well planned CAD/CAM system, the database can be used to produce both cost and time savings in manufacturing, work process planning, quality control, scheduling, purchasing, marketing, materials handling ---- in fact almost every activity between product concept and final delivery. With an improperly designed and structured database, the product definition can only be used to produce drawings and not drive the downstream manufacturing functions.



CIM

Computer Integrated Manufacturing may be defined as the use of computers to integrate the manufacturing, design and business functions of an organization. Through the use of CIM, the management staff at all levels of an organization has access to timely, purpose-directed information for decision making, control, and reporting.

Many companies proceed to the selection stage in acquiring the CAD portion of their CAD/CAM system without ever being aware of the role that the technical database plays in the productivity projections (and hence the cash flow projections) for the selected system. Much worse is that in many cases the company has not even identified the size and content of this database which has a crucial influence on the required size and characteristics of the selected system. The definition of the technical database is one of the most frequently overlooked items in the selection of graphics systems because of the common inability of contemporary engineers to understand its technology, costs and implications.

The design and implementation of CAD/CAM systems must be evolutionary not revolutionary in nature. In addition they must be designed to be compatible with the existing business structures and life style of your company. Typically it takes six to eighteen months to justify, select, purchase and implement a commercially available turnkey CAD system. The development of a fully integrated working CAD/CAM system takes three to five years and considerable corporate resources. Because there is an uneven distribution of resources throughout the project, with additional resources being committed at each step of the development, it is essential that the initial planning and justification be the best that can be obtained. It is better (and less expensive in the long run) to make a substantial investment in the initial planning and justification than it is to cut costs on the planning phase and end up committing resources to a poorly conceived system design. Although total system costs are high, proper system planning and design is only a small fraction of this cost but a major contributor to the overall success of the project.

The rapidly growing field of CAD/CAM will place a heavy burden on the personnel of any corporation just now beginning to use this technology. The pace of development alone demands a major commitment by high level management to keep abreast of the current realistic possibilities. Making a decision about a corporate investment which has such wide-spread implications for the corporate information flow, requires a sound knowledge of such factors as computer database design, computer networking, the latest peripherals and benchmarking. From the management point of view, discounted cash flow, management control requirements and the availability of competent personnel are critical considerations. It has been our

experience that this blend of knowledge does not exist except in those corporations with a pioneering involvement in CAD/CAM. This lack of mature CAD/CAM knowledge within a corporation can be offset by the use of our personnel to guide management and engineering in their planning and decision making functions.

Implementing an integrated CAD/CAM system will provide corporate management with new potential benefits to be derived from the new levels of information available. When fully operational, an integrated system can provide management with timely information concerning the real costs of a project, its current status, delivery schedules for components, systems, etc. Therefore, it is imperative that senior management be involved and guide its introduction into the company. Further, because of the commonly observed effect that CAD systems reduce the cycle time from design to sales, it is also necessary for management itself to consider the strategic implications of this reduced lead time and its effect on the decision processes for marketing, purchasing, manufacturing scheduling, etc.

The future is computer integrated manufacturing (CIM) where the computer is used to collect and control all the data pertinent to a manufacturing organization. These data are then processed automatically, or on demand, to extract the information necessary for the management and control of the business. Are you ready for the future?

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For Further Information Contact:

Dr. Warren F. Hastings
Managing Consultant
(214) 739-3056



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unexpected pitfalls.

Specifically **The CAD/CAM Audit** will:

- define work tasks and data flows,
- match CAD/CAM system components to work tasks for maximum productivity increases,
- quantify cash flows, and
- result in a long-range time-phased plan for CAD/CAM system implementation.

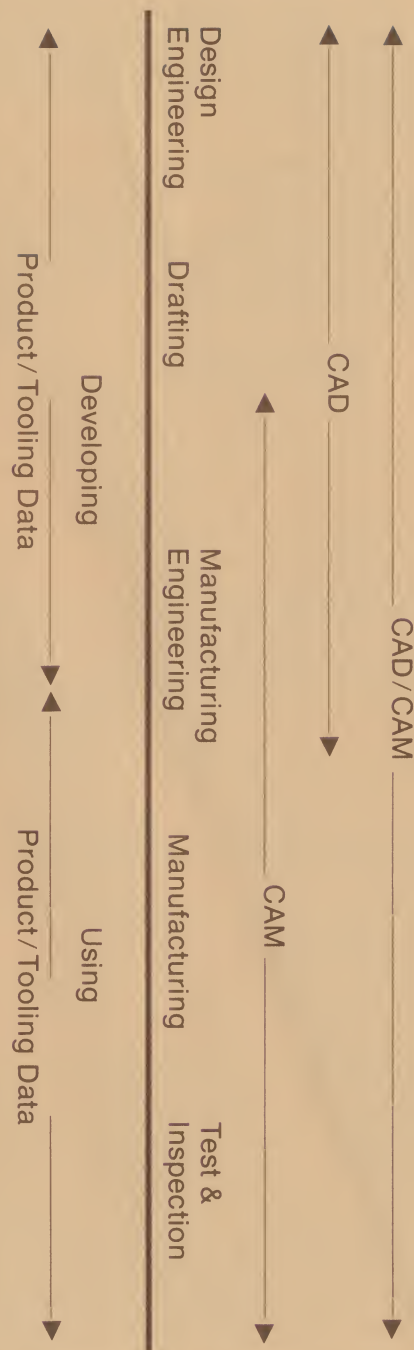
HOW TO GET STARTED

Current and prior corporate customers usually have already begun their CAD/CAM analysis when they discover our ability to significantly aid their efforts. Generally, we are then retained either to provide a management briefing, or for one or two days of consulting to determine if **The CAD/CAM Audit** would significantly increase their confidence in any planned capital acquisitions.

If you would like to discuss **The CAD/CAM Audit**, please call:

North / South America and Pacific
Dallas, Texas • (214) 739-3056

East / West Europe and Middle East
Peterborough, England • (0733) 69279



THE CAD / CAM AUDIT

A FORMAL INVESTMENT
JUSTIFICATION
PROCEDURE FOR
COMPUTER AIDED
DESIGN AND
MANUFACTURING

BY



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P.O. BOX 8100 • 5622 DYER ST. • (214) 739-3056
DALLAS, TEXAS 75206, USA

BACKGROUND

Over the past decade thousands of corporations have started using elements of CAD/CAM systems to increase their productivity, reduce product cost and increase product quality. These systems are intended to help them meet the challenges of inflation, a dwindling skilled labor supply, and heightened market competition. Decisions related to developing a proper CAD/CAM system should be derived through the use of **The CAD/CAM Audit**.

The CAD/CAM Audit provides the framework for evaluating your potential CAD/CAM applications in terms of the related benefits and associated costs. In most cases, productivity improvements will be more than sufficient to justify implementing CAD/CAM techniques. Many corporations have seen work task throughput improvements in the range of "2 to 1" to "20 to 1." Isolated cases have been much higher than "20 to 1." Generally, these tales of super success result from applying unique hardware/software packages to unique problems.

However, the potential payback is even greater if your corporation's "common" data are properly accommodated. If you can avoid reentering, reconstructing, reformatting, reverifying, and reproducing the common data, your payback will increase even more. Also, other far-reaching effects of CAD/CAM should be considered because the advantages of CAD/CAM entail much more than strict payback considerations. Some examples of these benefits are:

- Better Product Quality
- Faster Cycle Time to Marketplace

- Fewer Engineering Changes
- Better Coordination Between Design and Manufacturing

PURPOSE

The CAD/CAM Audit will help you determine what CAD/CAM techniques and systems can most effectively contribute to increasing your productivity.

OBJECTIVES

The CAD/CAM Audit's structured discipline will help assure that you:

- understand the data flow in your design/manufacturing operations;
- evaluate the potential impact on various operations affected by new or different CAD/CAM techniques;
- plan a long range strategy for increasing your overall productivity;
- identify alternative computer-based methods to aid the design/manufacturing data flow;
- develop a realistic and effective time-phased CAD/CAM implementation plan; and
- maximize the benefits from your investment in CAD/CAM.

OVERVIEW

The CAD/CAM Audit will lead you through the tough jobs of both data collection and data verification. You can not afford to merely isolate the data associated with "electrical," "mechanical," "civil," or "chemical" engineering. First, you need to identify the specific tasks appropriate to CAD/CAM at the "circuit analysis" or "linkage design" level. Second, the magni-

tude and impact of those tasks must be clearly established.

Data collection and verification is the key element in planning an effective CAD/CAM system. Some data are unique to a given task and other data are common to many tasks. The "unique" data are critical to evaluating CAD/CAM packages for enhancing given tasks. The "common" data are the most important consideration in designing the overall company-wide CAD/CAM system. These "common" data serve as the integrator between the design and manufacturing processes.

Data verification will provide a high degree of confidence for the ensuing decisions. Major direct cost decisions will be based upon these data. Further, the costs associated with training, reorganization, database design and construction, etc., must also be thoroughly evaluated.

WHY YOU NEED THE CAD/CAM AUDIT

We are all in a new era. CAD/CAM techniques now give manufacturers control over all their information for the first time. It takes a lot of work to be ready to install or upgrade a CAD/CAM system. For this reason, many companies let each department justify their "own system." Consequently, they have a narrow perspective and they usually miss most of the benefits derived from processing their "common" data. You need to have the independence and objectivity to keep the "BIG picture" in focus. Using the structured discipline of **The CAD/CAM Audit**, you can anticipate your future expansion needs and avoid costly false starts and



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- MANAGEMENT'S
GUIDE TO
COMPUTER
INTEGRATED
MANUFACTURING
- A SURVEY OF COMMERCIAL
TURNKEY CAD/CAM SYSTEMS
- A SURVEY OF
INDUSTRIAL ROBOTS

WHY DO YOU NEED THESE REPORTS?

It took our CAD/CAM professionals many man-months of work to compile this information — even with excellent cooperation from the staffs of the vendors.

YOU NEED TO SAVE THAT TIME !

ROBOTS...

A SURVEY OF INDUSTRIAL ROBOTS

WHY THIS STUDY?

In the past year, the attention being given to robots has increased dramatically. New vendors, new products and new capabilities are appearing monthly. Robots are now enjoying acceptance as manufacturing tools. The aura of "science fiction" is gone.

Being consultants in the productivity area specializing in computer aided design and manufacturing, we realize that most of the companies yet to benefit from robots are just now beginning to investigate seriously.

The purpose of this report is to give you a fast start on the who, what, when, where, why, and how of industrial robots.

WHAT IS A ROBOT?

Today's industrial robots are not the humanoids of science fiction. While some have "vision" and "touch", they are usually blind, dumb, and limited to pre-programmed motions.

Think of a piece of automatic handling equipment that can be programmed to do not just one, but a large number of production jobs. Also, think of a machine that can replace human labor where the job is dull, simple, or hazardous.

OUR INTENTION

It is our intention to have the reader of this report save countless hours of searching. Searching for the robot systems vendors, the questions to ask, and many of the answers.

THE VENDORS

A picture of a typical system from each vendor included in the study is accompanied by their address, phone number, Telex number or TWX number.

CONTENTS

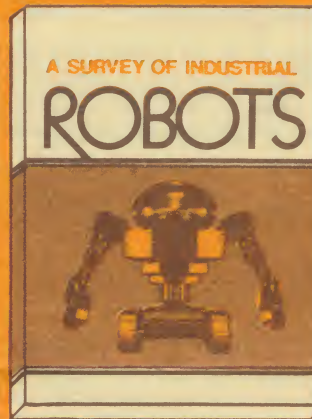
In addition to the thousands of answers that have been compiled for you in the Tabular Comparison as explained below, there are sections that have been written to aid your general understanding.

A section on Integration Guidelines discusses many aspects of integrating a robot into your operations. The topics covered range from the technical aspects of a hierarchical computer-based manufacturing system, to insuring the robot's social acceptability to your employees.

The section on Justification addresses the question of cost/benefit tradeoffs.

General Applications are covered in another section from the generic point of view. The reader is not bored with a compendium of case studies, but rather the fundamentals of various classes of applications are discussed.

The section on the Future gives you a glimpse of coming capabilities that will result from advances in Artificial Intelligence, computer networking and other technologies.



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THE TABULAR COMPARISON

This 112 page table is a matrix of the answers to over 150 key questions for each of over 20 vendors — over 3000 cells of information!

For each of the vendors you will find the answers to such questions as:

- Typical price of a one unit system, and price for each additional unit.
- What are the ambient operating temperatures for:
 - Control console and remote controllers?
 - Manipulator?
 - Hydraulics?
- What is the commandable resolution of the robot?
- What is the repeatability of the robot?
- Which types of grips are standard?
- When tracking, what is the maximum error from a true path?
- What tactile sensor(s) are supported?
- Can the robot interface with CNC or DNC set-ups?
- What services are available to the user, such as grip fabrication, system design, etc?
- If the control system is not an integral part of the robot, what is its weight? What is its space requirement?
- Typical instruction execution speed.
- What type of memory protect or verification methods are being used?
- What is the maximum number of sequences or steps available?
- Is the system which provides the electrical power an integral or separate part of the robot?
- When operating with standard voltages, is a regulated power supply recommended or required? If so, is it supplied with the robot or sold as an option?
- If the robot is "trained" at one speed and "executes" at another speed, are the acceleration and deceleration of the programmed path automatically adjusted by the system?

CAD/CAM COMPUTER AIDED DESIGN (CAD) AND COMPUTER AIDED MANUFACTURING (CAM)

WHY THIS STUDY?

Being consultants in the productivity area specializing in CAD/CAM, we realized that most of the companies yet to benefit from these techniques are just now beginning to look at turnkey systems.

The purpose of this report is to give you a fast start on the who, what, when, where and how of commercial turnkey CAD/CAM systems.

WHAT IS A TURNKEY CAD/CAM SYSTEM?

You will find two schools of thought on this question. The first emanates from the drafting field and views a turnkey CAD/CAM system as a minicomputer-based drafting/design aid with stand-alone capability. The second emanates from large scale engineering computation and visualizes terminals remote from a host mainframe computer with the ability to support design drafting and heavy computation. From either type vendor you can purchase or lease a hardware/software package (Turnkey System) that will help you increase your engineering productivity.

OUR INTENTION

It is our intention to have the reader of this report save countless hours of searching. Searching for the CAD/CAM systems vendors, the questions to ask, and many of the answers.

BENEFITS

A list of over 20 potential benefits of using CAD/CAM techniques.

THE VENDORS

A picture of a typical system from each vendor included in the study is accompanied by their address, phone number, Telex number or TWX number.

GUIDES FOR DEVELOPING YOUR SYSTEM

Whether you are installing your first system, or enhancing what you have, you must in effect "audit" your operation. This section tells you how to collect the pertinent data to develop a pro-forma workload for cost/benefit justification.

THE TABULAR COMPARISON

This 106 page table is a matrix of the answers to over 100 key questions for each of over 40 vendors — over 4000 cells of information!

For each of the vendors you will find the answers to such questions as:

- What is the typical designer/draftsman productivity improvement ratio?
- What is the number of user terminals allowed per system?
- What computer/word length/execution speed is used?
- Does the system support on-line communication with host processors?



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- What are the input and output devices?
- Is bill-of-material capability available?
- Are objects described in 2, 2½, or 3-D?
- Is dimensioning automatic, semi-automatic or manual?
- Is the source code available?
- Where are spare parts stocked?

And for software packages you will find answers to questions such as?

- Price and terms?
- Is error checking supported?
- Can design work and applications development be done simultaneously?
- Is software open-ended?
- Can active and non-active drawings be merged?

OTHER CONSIDERATIONS

The purpose of this brief section of the report is to stimulate your thinking. Helping you solve your problem with a quick guide is out of the question. Your own unique corporate infrastructure will determine many aspects of the approach that is right for you. Realize that while the following considerations are categorized in the report for your ease in reading, they are all truly inter-twined and interdependent.

ORGANIZATIONAL IMPACT

This material explains several key impact areas, and discusses potentially significant management changes.

COST/BENEFIT TRADEOFFS

Recurring and non-recurring costs are described along with key economic factors. Purchase or lease is discussed, and cash flow analysis is explained.

GROWTH

You are bound to have some degree of success with your move into CAD/CAM, and when you do, your expectations will rise. You can count on new computer technology continuing to roll forth usually cheaper, certainly more powerful and probably requiring software changes. Then will your CAD/CAM system grow in a debugged way at the pace you want?

SAVE TIME AND MONEY — BE INFORMED

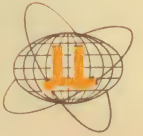
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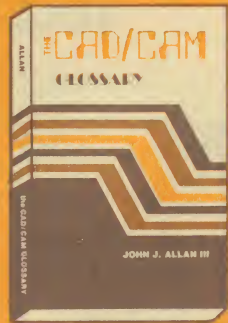
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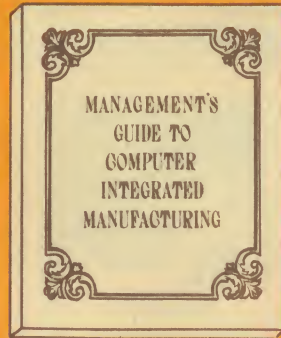
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"MANAGEMENT'S GUIDE TO COMPUTER INTEGRATED MANUFACTURING"

THE SCOPE

There are two major approaches to industrial productivity improvement — sociological and technological. The first deals with human attitudes and the second with the leverage provided by electro-mechanical devices. You will need to consider and use parts of both complementary approaches.

This Guide concentrates on the management of technological productivity improvement. The key is new uses of the computer. Modern business runs on information — and handling information is what the computer does best. Today's managers with enough line or staff experience are required to make significant investment decisions in this area. They do not need to know how to program computers — they do need to know how to manage computer integrated manufacturing. That's why this Guide has been written.

WHAT and WHY?

Computer Integrated Manufacturing (CIM) is a strategic issue not a technical one. You should be planning for the rest of this decade now. Cost effective and truly new ways for you to get a handle on the information in your organization are becoming available. Today, managers are frequently unsure of what computer aided design and manufacturing embraces. This Guide not only clarifies what topics are actually elements of CAD/CAM — it goes one step further. It tells you how to plan to integrate all sorts of "smart" equipment — engineering design stations, machine tools, word processors, inspection devices, planning systems and much more. Surely some integration of your facilities will be mandatory if you are to remain competitive — because you will more quickly have better information. Hence, the integration of information-generating and information-using systems in the industrial arena is what CIM is all about.

OUR INTENTION

This book is a guide. It is not being sold as a handbook with all the answers. The technologies that make up

CIM are explained, and many management tactics for gaining control of the fast paced information flow in your operations are suggested and explained. CIM depends heavily on your existing organization — and that is what you know best. Hence, it is our intention to suggest how to take what you know best and gain control of it by harnessing its information flow.

CONTENTS

Introduction

This section explains why the new technologies are forcing managers to abandon seat-of-the-pants decisions. A broad architectural framework for information flow in the engineering/manufacturing organization is described from a management perspective.

The Topics of CIM

Trying to maintain a state-of-the-art knowledge of the elements of CIM is difficult at best. In this section, such topics as databases, networking, group technology, robotics, computer aided design, shop floor systems and many others are described.

No Pat Answers

CIM touches all parts of your company. How each group is influenced, the technologies that are appropriate to each (and why), and the fact that there are no pat answers, are all discussed in detail.

Your Task Force

The selection of the members of your task force and the message that they internalize about their mission are critical to the success of your CIM implementation. This section discusses the details of creating and managing this special team.

Analysis

Reliable financial analyses can be generated for any planned improvements. This section begins by discussing work task data and their relation to new equipment. These data are the foundation of any cost/benefit

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analysis. This section closes with a discussion of the justification of these capital expenditures.

Planning

The result of good planning is that you will translate leading edge technologies into solutions. Developing an evolutionary plan is discussed as well as how you proceed from your data to what needs to be done.

Implementation

After some general caveats about implementation today, a rather comprehensive and detailed list of considerations is presented. Your success in the area of implementing CIM will depend heavily on your ability to manage the details through your task force. Yet there are broad problems for which no solutions currently exist.

You must keep your knowledge of this field current. You are the manager of the '80s. It is important to view your development of your organization in the light of your planned CIM implementation. A discussion of this closes the book.



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FOR IMMEDIATE RELEASE:

NEWS RELEASE

PRODUCTIVITY INTERNATIONAL, INC., AT SIGGRAPH '81

Productivity International, Inc., will be available with the latest CAD/CAM and Robotics information, to meet the needs of industry, at their exhibit area in the ACM SIGGRAPH '81/ Computer Graphics Exhibition at the Dallas Convention Center, August 4th through 6th.

Productivity International, Inc., a Dallas headquartered company, will occupy booth number 948, in the right rear corner of the exhibition area.

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.



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FOR IMMEDIATE RELEASE

NEWS RELEASE

PRODUCTIVITY INTERNATIONAL EXECUTIVE RECEIVES AWARD

Dr. John J. Allan III, President of Productivity International, Inc., of Dallas has received the prestigious "IFIP Silver Core Award". The "Silver Core Award" was presented to Dr. Allan by Professor Dr. P. A. Bobillier, the president of IFIP (International Federation for Information Processing) of Geneva, Switzerland. The award was given to Dr. Allan in recognition of his contributions to the IFIP organization since 1972.

Dr. Allan served as vice-chairman of Working Group 5.2 (Computer Aided Design), and during 1977 - 1980, as United States representative to Technical Committee 5, Computer Applications in Industry. The International Federation for Information Processing as organized by scientists and engineers working with the United Nations to foster the development of international computer applications.

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.



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NEWS RELEASE

FOR IMMEDIATE RELEASE:

DR. WARREN F. HASTINGS NAMED MANAGING CONSULTANT

Dr. Warren F. Hastings, senior consultant, with Productivity International, Inc., has been named managing consultant.

In addition to providing consultant services, Dr. Hastings' responsibilities include management of all Productivity International consulting personnel, and the overall administration of PI consulting services. He reports to Dr. John J. Allan III, president of Productivity International, Inc.

Hastings had been the manager of Manufacturing Systems Division for B.S.P. Technical Services Group of Sydney, Australia before joining Productivity International, Inc.

FOR FURTHER INFORMATION CONTACT: ^(over) Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.

Dr. Warren F. Hastings, Managing Consultant

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A native of Australia, Hastings recieved his BSc (tech) and PhD degrees in Industrial Engineering from the University of New South Wales, Sydney, Australia in 1967 and 1976 respectively.

Productivity International, Inc., has its international headquarters in Dallas.

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.



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NEWS RELEASE

FOR IMMEDIATE RELEASE:

JAMES L. MCDONALD NAMED SENIOR CONSULTANT

James L. McDonald has joined Productivity International, Inc. as senior consultant.

Mr. McDonald will be responsible for providing consulting services to clients in the area of CAD/CAM with emphasis on computer aided design and integrated data base systems.

Before joining Productivity International, Inc., Mr. McDonald was senior consultant in CAD/CAM Planning and Marketing at McDonnell-Douglas Automation Company, St. Louis.

Mr. McDonald majored in mechanical engineering at Purdue University, and now lives in Dallas with his wife, Mickey and their two children.

FOR FURTHER INFORMATION CONTACT: Sonia Mansfield; Public Relations Department; Productivity International, Inc.; P.O. Box 8100; 5622 Dyer Street, Suite 225; Dallas, Texas 75205; (214) 739-3056.

PRODUCTIVITY INTERNATIONAL BIBLIOGRAPHY INDEX

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Arizona Republic	3/81	Frank Vaughn	Robotics Could Lead to New Industrial Revolution	News Story of Robot Survey and American Industry
Dallas Magazine	3/81	Pauline Neff	Productivity International Counsels on Robot-Phobia	News Story of recent interest in Robotics for the future of U.S.
American Machinist	3/81	-	New Books-Robot Review	
Popular Science	2/81	Tim Scheffler	Designed by Computer	General Industry, State-of-the-art article referencing our publication
Computer World	1/19/81	Bruce Hoard	Survey Gives Close Look at US Robot Vendors	Complete Book Review and industry comment
The Gallagher President's Report	1/81	B. Gallagher	Survey of Industrial Robots	Book review of Robot Survey
Dallas Magazine	3/81	-	Chamber Reports-Co	
Heat Treating	1/81	-	Survey of Industrial Robots' Publications	Review of Publication
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Dallas/Ft. Worth Business	11/3/80	Debra Farst	CAD/CAM: Extending Range of Computer	General CAD/CAM article including interview with Dr. Allan
Womens Wear Daily	11/3/80	-	Industrial Robots increasing in US	Interview with Dr. Allan on Robotics
C.P.A. News	10/80	-	Is CAD/CAM for your client	Dr. Allan and his publication about CAD/CAM
The Harvard Newsletter	8/29/80	-	A Survey of Commercial Turnkey CAD/CAM Systems	Book Announcements CAD/CAM and Robotics
American Machinist	7/80	-	Computer Graphics goes to work	Segments of our Publica- tion on CAD/CAM are a major part of material discussed in article
Design Engineering	7/80	-	Marketing Perspective	CAD/CAM Systems guide could spark new sales
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New York Times	10/14/79	P.Applebome	A Whole New World	Interview with Dr. Allan concerning CAD/CAM & the future of American Industry